Power and politics in plastics research: A comment on 'Whither Plastics?'

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Abstract

In his article 'Whither Plastics?—Petrochemicals, plastics and sustainability in a garbage-riddled world' , Michael Jefferson [1] discusses a number of recent issues around plastics, including plastics' dependence on fossil fuels, its contribution to ocean waste, and its possible impact on human health. Despite these multiple ways in which plastics are framed as (potentially) problematic, the author is clear in his recommendations: the most important form of action is behavioural change. While we strongly welcome social science research into plastics, we have a number of issues with the study in question which we deem significant enough for us to write this response. At the heart of our concern is the paper's handling of extant research. There are three aspects to our critique: (1) conflations and misrepresentations of the data presented; (2) disregard of academic social science research on plastics; (3) the resultant promotion of over-simplistic solutions to a complex set of problems.

Lies, damned lies and statistics?

Our first concern is that there appears to be a number of inaccuracies and conflations in the data represented in the text. For example, on page 2, the author writes *"fishing nets are estimated to account for 46% of the garbage, over 25% of the rest being other types of fishing gear – ropes, crates, baskets, oyster spacers, and eel traps. Plastics are estimated to account for only 8% of the total tonnage of garbage"*. This 8% figure is clearly incorrect, as much of the fishing nets and fishing gear is indeed made of plastics. However, it is only if either one reads through to the conclusion, or spends time searching the internet (as the author provides no source for these figures) that the reader learns that the 8% figure only refers to microplastics, not plastics in general (see [2] for the original study). This distinction is important for communicating the scale of the ocean plastics problem.

We also want to discuss the author's use of the BP Energy Outlook. While the assumptions underpinning the Outlook can be questioned (e.g. [3]), here we wish to focus on the author's misrepresentation and misinterpretation of various statistics from this document. For example, the author states that BP's energy outlook envisages a decline in oil demand of 3 million barrels of oil per day (mb/d) if single-use plastics were banned. This is a misreading: the BP outlook envisages that banning single use plastics would lead to a 6 mb/d reduction by 2040 compared to BP's baseline scenario, or a 9 mb/d reduction "relative to a continuation of past trends" [4, pp. 33-35]. Secondly, the author argues that a reduction of 10 mb/d raises the possibility of "erasing any increase in global oil demand by 2040, which is otherwise projected to rise from 98 mb/d in 2017 to 108 mb/d in 2040 even under BP's 'Evolving transition scenario'" [1, p.1]. According to the BP Outlook, however, these figures (98 and 108 mb/d) refer to all liquid production, not just oil [4, p.135]. Finally, we would find it helpful if the author could point us to where the BP Outlook states that global demand for petrochemicals accounted for 12 mb/d in 2017, and has been estimated as likely to grow to 18 mb/d by 2050, as this

appears both at odds with the information presented in Figure 1, and at odds with all other statistics included in the Outlook, which only presents trends until 2040.

While we have concerns about the lack of evidence for some of the author's other arguments, in the interest of space, we wish to move on to our second point.

Energy Research & ...

Although we believe the aforementioned errors are regretful, we see them as indicative of a more significant problem: the paper's lack of thorough engagement with existing research. As scholars, we are all too aware of being unable to cite everything. Our second concern with the piece *Whither Plastics?* is not that it does not cite all social science academic literature on plastics, but that it does not cite *any*. Citation matters. Not only does it enable one to frame one's own research in a particular way, but in doing so also recognises and validates the work undertaken by others. This matters for the development of new knowledge, the direction in which research (and disciplines) evolve, and how their histories are written [5] (Pugh, 2018).

For the development of the field, we therefore think it is regrettable that Professor Jefferson did not cite any social science studies, especially when there is such a rich field to choose from. We are thinking for example of the interdisicplinary work by Max Liboiron and her lab [6, 7]; Catherine Phillips' [8, 9, 10] and Elyse Stanes' [11] work on the cultural and material politics of plastics; the work of Tobias Nielsen and colleagues on the politics of plastics [12 ,13][1]; Karen Raubenheimer work on transnational initiatives [14, 15]; Elizabeth Mendenhall on the plastics problem in ocean governance [16]; as well as natural science scholars who have engaged with the political dimensions of plastics, such as Chelsea Rochman and Stephanie Borrelle [17, 18, 19]. The Discard Studies website (https://discardstudies.com/) is also an excellent resource for those looking for humanities and social science research on waste and plastics. This is before even mentioning long-standing work on plastics by scholars such as Gay Hawkins and Peter Dauvergne.

We will discuss the implications of this lack of engagement for the solutions suggested in *Whither Plastics?* below, but we also feel the need to point out that being attentive to the question of who and what gets cited is also important here. Some of the most recent and novel social science research referred to above has been published by junior and/or female scholars. Academia has a well-reported issue with uneven representations, including through citation practices, based on gender, race and geography (see for example [20, 21, 22, 23]), and indeed, our selection above reflects our own geographical bias as well. Senior colleagues, editors and reviewers have an unrivalled ability to address these issues, and we therefore find it disappointing, and somewhat surprising, that throughout the review process of *Whither Plastics?*, no-one picked up on this absence of engagement with this substantial body of both well-established and recent work.

Furthermore, the disregard for social science research on plastics also indicates a lack of engagement with *what this work tells us*, resulting in a set of suggested solutions that - as we will demonstrate below - are increasingly shown to be insufficient and inappropriate for the problem(s) at hand.

[1] For full disclosure: one of us is a co-author on one of these papers

Why behaviour change is not a silver bullet

Following on from the above points concerning the general lack of engagement with social scientific literature, Jefferson writes in the paper's abstract that *"the most important way forward is behavioural change among plastics users to economise on plastics usage and avoid litter"* [1, p.1]. Seemingly, the author felt this argument was sufficiently self-evident that it did not require supporting evidence for the efficacy of behavioural change. The author does not clarify whether he is arguing for government intervention or whether behavioral change should be pursued through softer approaches such as awareness-raising campaigns, education, nudging, or the advancement of new norms. Elsewhere the author does mention the importance of institutional responses, only to reiterate in the conclusion that *"the most important avenue for reducing plastics wastage and dumping is behavioural change among people across the world"* [1, p.7]. While it is therefore not entirely clear what the author considers the relation between these different problems (usage/wastage) and solutions (behavioural/institutional) to be we wish to be clear: we do not believe that the evidence supports the argument that behavioural change is *the* most important way to tackle plastic's multiple (waste and climate) crises.

Firstly[2], behaviour change as a means to address plastics *waste* does not address the source of the problem. Focusing exclusively on waste management means the conversation is generally confined to what to do with plastics *after* it already exists, and risks ignoring how that-which-will-become-waste comes into being in the first place [24, 25, 26]. More than 8300 million metric tons of plastic have been produced to date [27]. If current projections hold, our societies worldwide will have to handle double the amount of plastics currently circulating within twenty years [28]. While industry is shifting responsibility for plastic waste to individual consumers [29], they are simultaneously investing (supported by generous tax breaks) into plastics infrastructure, with the aim of continuing, if not increasing their plastic production for decades to come [30, 31]. In the case of plastics, a focus on littering and waste diverts attention away from the responsibility of producers [32, 29; see also 26], and could inadvertently encourage the consumption of plastics [33], thus potentially increasing plastics' climate impact.

Secondly, the evidence for *behavioural* approaches in tackling waste is ambiguous. While there is some evidence to show that attempts to address behaviours through policy have had some effect (e.g. [34, 35], there is little evidence that common, 'softer' awareness-raising efforts have changed people's behaviour [36, 37, 38]. More importantly, consumers, industry, government actors, and others are not operating in isolation from each other; their actions also co-shaped by plastic's complex materialities [6, 11, 18], the desires it has helped constitute [39], and the wider socio-technical system in which they are situated [19, 34]. To pull just a single lever of these complex systems, such as individual littering behavior, even when supported by government policy, is unlikely to achieve the kind of large-scale change required if the remaining components of our social, political, cultural and economic systems are

[2] Due to space limitation we focus here primarily on critiques emerging from work adopting a socio-technical perspective

unanimously aligned towards maintaining plastics' position at the heart of modern day society [13, 40, 41].

The structural conditions that have created the global plastic pollution problem are multiple: plastic is too cheap, designed to be disposable, and waste management systems are inadequate and reliant on exports from rich to poor countries [19, 42]. Individual behaviours are unlikely to be able to tackle these issues. Instead, concerted action at different scales and by different actors is required [43]. On the waste side, this will require recycling and recycled plastics to be made financially viable in comparison to virgin plastic production, for example. On the production side, extended producer responsibility schemes plus eco-design criteria are necessary in order to force producers and packaging companies to depart from disposable uses of plastics towards reusable and recyclable ones [25, 44; see also [45]]. Enacting such changes will require a multitude of solutions and an engagement with the politics of plastics at all stages of its life cycle - especially on the design and production stage, where political attention has been sorely lacking to date [13, 41]. It also requires bold, innovative approaches that dare to depart from the incrementalism that has defined in particular the European Union's circular economy initiatives to date [46]. While behaviour change may be one possible strategy, its presentation as the 'most important avenue' for change oversimplifies the complexity of the plastic problems that societies face today and is unlikely to be able to fix a systemically malfunctioning plastics production and waste system.

In sum, we believe that social science research into plastics is essential for understanding its multiple qualities, problems, and possible solutions. Nonetheless, we find it difficult to understand how *Whither Plastics?* was published in its current form. While we believe that to err is human, the paper's disregard for the insights gained through previous social science studies, is difficult to understand, especially when published in a journal which places such an emphasis on the social sciences. Extant social research on plastics has already added great depth and breadth to our understanding of society's complex relation with plastics, and it is genuinely disappointing to see this work ignored in this way. Consideration of this work would have not only brought to light the limitations of the solution(s) suggested, but would have also aided the collective endeavor of furthering a social science research agenda for this emergent field.

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